1930

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VEGETABLE GROWERS' NEWS LETTER

Issued by
The Maryland Vegetable Growers' Association
W. R. Ballard, Secretary-Treasurer.

Vol. VII. No. 1. College Park, Maryland. January, 1930.

The Annual Meetings: The accomodations for the annual meetings at the Lord Baltimore Hotel were very much more satisfactory for the Vegetable Growers Association this year than has been the case on some previous occasions.

The joint session with the Crop Improvement Association on the first day seemed to work out satisfactorily and the discussions were interesting and helpful.

The officers elected for 1930 are as follows:

Iresident — W. N. Eyler, Flintstone, Md.
Vice-President — S. S. Merrit, Jr., Colgate, Md.
Secretary-Treasurer — W. R. Ballard, College Park, Md.

Members of the Executive Board:
A. M. Todd, Sparrows Point, Md.
R. T. Merritt, Colgate, Md.
R. Phelps, Brooklyn, Md.

Director for Agricultural Society and Farm Bureau Federation:
B. I. Sparks, 825 East 33rd, Street, Baltimore, Md.

Delegate to Annual Meetings:
W. R. Ballard, College Park, Md.

Director for Agricultural Corporation:
James W. Davis, Rockd, Md.

High Lights of the Program: Mr. Thomas H. White gave a resume of experimental work with truck crops carried on at the Station over a period of thirty years in relation to the maintenance of soil fertility. He stated that commercial fertilizers could be profitably applied in amounts up to 1000 pounds per acre per year for most vegetables and as high as 1500 pounds for potatoes, spinach and cabbage, when the crop is grown for early use. It pays to use commercial fertilizers but the returns are proportionately less as the amounts of high grade fertilizers are increased. The largest percent of increase is from the first 500 pounds of fertilizer and likewise from the first four tons of manure. Mr. White stressed the importance of thorough mixing with the soil when relative large amounts of commercial fertilizers are used.

In discussing Tomato Fertilizers for Quality, R. P. Thomas stressed the danger of nitrogen fertilizers leaching out of the soil, thus rendering it unadvisable to apply larger quantities than can be used up by the crops during the current season. Phosphate fertilizers move very little from the point of application so should be distributed where it can be reached by the roots. This fact makes such fertilizers unsuitable for topdressing.

Dr. J. E. Metzger, reviewed the experimental work carried on over a period of six years in the fertilizing of early potatoes. One point brought out was the unaccountable superiority of muriate over sulphate as a form of potash for early potatoes.

Dr. L. H. Flint of the U. S. Department of Agriculture gave a humorous and informative talk on the "Practical Aspects of Paper Mulch in Vegetable Growing." The mulch paper has, perhaps, its main application to the home garden, although its use by market gardeners is growing particularly with those crops where early maturity is a factor. Some of the difficulties of applying the paper and keeping it in place are being worked out by practical growers. One interesting factor which has come to light is the effect of the paper on the nitrifying organisms in the soil.

At the second session Dr. R. A. Jehle discussed the group of diseases commonly referred to as virus diseases. Their control has become increasingly important, yet the nature of the troubles is such as make their detection and control difficult. Two new methods of control which give considerable promise are tuber units and tuber indexing. These methods and their future possibilities were discussed.

Dr. E. N. Cory, reviewed the work with the Mexican Bean Beetle and gave recommendations for its control. Experiences of the past year proved conclusively that the early application of control measures was all important.

Magnesium arsenate at two pounds to one-hundred gallons of water used as a spray has proved to be the most effective control. Next in order was 20-20-60 copper arsenic lime dust.

L. M. Goodwin pictured the development of the canning industry in the State and emphasized its commercial importance. The annual cash value to the producers of raw stocks for canning is approximately seven million dollars, while the total value of the industry to the State is variously estimated at thirty to forty million dollars annually. Strong competition from newer producing areas behooves Marylanders to keep abreast with the latest scientific development in order to maintain this important source of wealth.

The Canners School: The University of Maryland will conduct its third annual Canners' and Field Men's School on February 18th to 20th. The detailed printed program will soon be ready for distribution and a copy will be sent to each member of the Vegetable Growers' Association.

VEGETABLE GROWERS NEWS LETTER

Issued by
The Maryland Vegetable Growers Association
W.R. Ballard, Secretary-Treasurer.

Vol. VII. No. 2. College Park, Maryland. February, 1930.

The Fifteenth Census: Sample copies of the General Farm Schedule of the 1930 census are being distributed. It is suggested that all the questions be studied and the answers to all inquiries applying to the particular farm be entered in the proper places so that all questions can be readily answered when the enumerator arrives.

The census as related to the farm is divided into two parts. The first part is the Inventory the items of which are to be entered as of April 1st, 1930. The second part has to do with production items and these are for the calendar year 1929. The actual enumeration will begin on April 2nd.

In addition to Irish and sweet potatoes the schedule will include the following vegetables: asparagus, beans (snap or string), cabbages, celery, corn (sweet), cucumbers, lettuce, onions (dry), peas (green), spinach, tomatoes, and watermelons. Minor crops not listed will be included.

With the development of agencies for cooperative marketing it is becoming increasingly important to have accurate data as to the extent of production of vegetable crops in the different areas. The taking of the farm schedules of the census should make an important contribution to our knowledge of the agricultural situation.

To Can the Tomato, What Tomato to Can? In Bulletin No. 318 of the Maryland Experiment Station, the author, Fred W. Geise, gives the results of a three year test of tomato varieties suitable for canning. In addition to the securing of yield records, canning tests were made during the 1927 season.

It is concluded from the results of this work that the Marglobe is slightly superior to other varieties for the Coastal Plain region in the matter of yield. Because of its high resistance to Fusarium wilt it is recommended for planting on wilt infested soils. The canning test showed that the Marglobe was outstanding in reference to its yield of U. S. No. 1's and to yield in cases of canned product per ton of raw stock.

For the Piedmont section the Greater Baltimore group is to be recommended. There is, however, very little preference as to which varieties of the Greater Baltimore group should be used.

The bulletin includes the results of a tomato wilt survey conducted in 1927 under the direction of Dr. J. B. S. Norton, Experiment Station Pathologist.

Organic Matter From a New Angle: The prevailing thought regarding the function of manures and other organic materials in the soil is: (1) to furnish plant food such as would be comparable to the nitrogen, phosphoric acid and potash of the commercial fertilizers, and (2) to provide a medium for retaining the moisture.

Despite the fact that carbon extracted from the carbon dioxide of the air forms one of the main constituents found in plant tissues, comparatively little attention has been given to question as to whether adequate supplies of carbon dioxide are available for plant growth. It is only through the action of light on the green coloring matter of the plant that it is possible to use this material in building up sugars, starches and other organic substances in the plant. It is usually assumed that the ordinary atmosphere contains sufficient carbon dioxide for plant needs. It has been found, however, that plants can utilize under the proper conditions as much as fifteen times the amount of the normal supply in the air.

Going back to the organic matter in the soil, attention is being given to the increased amounts of carbon dioxide given off through the fermentation and decay of these matters in the soil. Investigators are beginning to wonder if this may not be one of the major functions of these organic substances. It seems reasonable to surmise that a lack of available carbon dioxide in the air, might easily retard growth even though all the usual mineral salts were present in the soil to be taken up by the roots.

The Canners' School: One of the most successful schools for canners and field men ever held at the University of Maryland came to a close on Thursday, February 20th. The addresses and discussions were timely and many points of value were brought out. An abstract report of the proceedings will soon be available in mimeographed form and it is hoped that a copy of the report can be mailed to each member of the Vegetable Growers Association.

Notes: It may be of interest to those who have not heard, that Dr. F. W. Geise has severed his connection with the University and is now Crop Production Specialist with the American Can Company. Dr. Geise will make his headquarters at Rochester, New York.

Dr. Geise has made some important contributions to the vegetable industry of Maryland, and his leaving is a distinct loss to the University of Maryland as well as to the vegetable interests of the State. The best wishes go with Dr. Geise in his new work.

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A few of the members have not sent in their dollar for 1930 dues. Early attention to this matter will insure the continued receipt of the News Letter and a copy of the Annual Report which it is hoped will be available earlier in the year than usual.

VEGETABLE GROWERS' NEWS LETTER.

Issued by
Maryland Vegetable Growers' Association,
W. R. Ballard, Secretary-Treasurer.

Vol. VII. No. 3. College Park, Maryland. March, 1930

Lettuce Growing: W. R. Beattie, Senior Horticulturist of the U. S. Department of Agriculture is author of Farmers' Bulletin No. 1609, "Lettuce Growing." This publication deals with the outdoor commercial culture of this crop in the various sections of the United States. More than half of the production is in California, with Arizona, New York, Colorado and Washington important producing areas. Cultural methods are given as well as information regarding marketing.

The Canners School:

The report of the Canners School is incorporated in the News Letter because the information which it contains should be of value to market gardeners as well.

REPORT

of

CANNERS' AND FIELD MEN'S SCHOOL

Held under the Auspices of the College of Agriculture
and Agricultural Extension Division of the
University of Maryland in Cooperation with
the Tri-State Packers' Association

February 18th, 19th and 20th, 1930

at

College Park, Maryland

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REPORT

of

CANNERS' AND FIELD MEN'S SCHOOL

February 18th, 19th and 20th, 1930

College Park, Maryland

TUESDAY, FEBRUARY 18th

9:00 A.M. - ADDRESS OF WELCOME

The Annual Clearing House

by

T. B. Symons, Director
Extension Service, University of Maryland

A meeting of this kind furnishes the means whereby the experiences of different individuals may be summed up and presented for the good of all present. There are a number of serious considerations confronting the canning industry, probably more from the business end than from the standpoint of production. It is possible that some day there may be a real clearing house in the distribution of canned foods. At the present time many eastern products are being shipped to the West, and similar western products are being sold in eastern markets. The increase in importation of foreign tomatoes should call for much consideration as to quality of the product being canned here. It is discouraging to think that this State is not going ahead in buying and selling tomatoes on the basis of U. S. Grades. Several other states are trying this method and are finding it a big improvement over the flat-rate basis. It will be the duty of the canners to take the lead in demanding a graded system, and all should work together to make the first trials successful. It is only by mutual cooperation of canners, growers, and members of the College staff that the quality of Maryland products can be raised to compete with the outside trade.

9:15 - TOMATOES. Chairman, E. G. Cover, Easton, Maryland

Factors Responsible for the Disintegration of Canned Tomatoes

by

C. O. Appleman and C. M. Conrad, College Park, Maryland

The chief purpose of these laboratory experiments on the disintegration of canned tomatoes was to establish facts and thereby furnish a scientific basis for practical procedures.

With an understanding of the processes involved in the break-up of canned tomatoes and also of the factors which accelerate or retard these processes, the canner can then adopt such measures as are consistent with commercial canning house practices, to attain or at least approach the results desired.

There are several problems in connection with the disintegration of canned tomatoes that are yet to be solved, but by carefully controlled laboratory experiments some pertinent facts have already been established. These may be briefly summarized as follows:- (1) The cells in the tissues of the tomato are held together by a cementing substance called protopectin and the softening and final breakdown of the tomato parallels a transformation of the protopectin that causes it to lose its cementing properties. (2) This change in the protopectin proceeds very rapidly as the tomato approaches full ripeness, so it is essential to pick the tomatoes for canning at the earliest stage of ripening consistent with other desirable qualities of canned tomatoes beside the wholeness of the canned fruit. (3) Transformation in the protopectin and its loss of cementing properties continue during processing. The amount of protopectin transformed during processing is greatest in fruit that has over-ripened, either on the vine or after picking. (4) A minimum period of scalding and immediate sealing in the cans after scalding the fruit were found to be important details in the canning procedures which decrease the total amount of protopectin transformed during processing. (5) Conversion of the protopectin into other substances may go far after the fruit is processed. The slower the canned tomatoes are cooled the greater is this conversion of the protopectin. (6) Both the amount of protopectin transformed and the extent of disintegration of the canned product varied considerably with different pickings, regardless of variety. In general, the best canned product was obtained from mid-season pickings. It is possible that fruit of these pickings was a little less ripe than fruit of the other pickings. (7) The extent of the break-up of canned tomatoes after uniform mechanical shaking of the completely cooled cans was closely proportional to the total amount of protopectin that had been changed to substances with much less cementing properties.

Discussion:

There is considerable shrinkage due to the loss of water, if tomatoes are held a long time at the cannery before canning. There is very little difference in the amount of break-down between holding in sunlight or in shade, for a period of one day. Holding in especially high temperatures, however, does cause an increase in disintegration.

Tomatoes from plants with normal foliage stand up better in the can than those from plants partly or wholly defoliated.

It seems that break-down in the can is more serious if the duration of heat extends over a long period than if the intensity is high for a short period.

Fertilizers for Tomatoes, with Special Reference to the Use of Potash

by

Royle P. Thomas, College Park, Maryland

The chief plant foods or fertilizer ingredients of a mixed or commercial fertilizer are nitrogen, phosphorus and potassium, or, as they are sometimes spoken of, ammonia, phosphoric acid, and potash. The nitrogen, or ammonia, stimulates the vegetative portion of the plant such as stems and leaves. Regardless of the form in which the nitrogen is applied to the soil, unless it is as a nitrate, practically all of it is changed by biological processes into the nitrate. It is in this form that most of the plants require it, especially tomatoes. As nitrates are very soluble they are readily leached from the soil by rains if not used by the plants. This often makes late applications or top dressings of soluble nitrogenous fertilizers very profitable.

Phosphorus stimulates the production of fruit and very often roots in a plant. This makes phosphorus very important in tomato culture. When a phosphorus fertilizer is applied to a soil, the phosphorus as a rule is changed to a less soluble form. This phosphorus fixation takes place in the portion of the soil in immediate contact with the fertilizer, making the movement of phosphorus in the soil very slight. Consequently, a phosphorus fertilizer should be well mixed with the soil before tomatoes are set if best returns are desired.

Potassium improves the vigor of the plant. It will stimulate the plant and increase its consumption of other elements, especially nitrogen. When potassium, or potash, is applied to a soil it reacts with the exchange complex of the soil. This exchange is rapid and removes the potash from the soil solution and puts other bases as calcium and magnesium into the soil solution. As a result, very little potassium is lost by leaching and a reserve of potash may be quickly built up in the soil. This makes the top dressing or delayed application of potash undesirable for best returns of the potash fertilizer.

In experiments at College Park, phosphorus gave best results of the three elements, with nitrogen and potassium next in order. At Ridgely phosphorus also gave best returns. Potassium is more essential than nitrogen at Ridgely. From these results and those of other stations which have worked on

the fertilization of canning tomatoes it seems that a fertilizer for tomatoes should be highest in phosphorus with potassium and nitrogen respectively in decreasing amounts. When one considers the respective amount of phosphorus and potassium in the soil devoted to growing tomatoes for canning, these fertilizer results are easily understood. As a rule these soils are very low in potassium content. The increased need for phosphorus over potassium is made more acute by the changes which the two elements undergo when applied to the soil.

Experimental results have shown that best returns, as a rule, have been obtained when the fertilizer for a row or cultivated crop was applied in the row. If each crop in the rotation is fertilized, the broadcast application for peas, grains, etc., will offset or prevent the uneven growth following the row method of fertilization. Since tomatoes have to be grown in some kind of a rotation to prevent the spread of diseases, it would be much better for all the crops in the rotation if a liberal application of fertilizer is made to each crop. This removes the necessity of a special and often very expensive fertilizer for one crop, as tomatoes. In addition, such practices would tend towards a more stable and permanent agriculture in these sections.

The formula of the fertilizer, or the ratio of nitrogen, phosphoric acid, and potash in a fertilizer for tomatoes, may vary considerably for each farmer. In general, the results here, as well as those from several other experiment stations, show that a 2-8-5 fertilizer would be better than a 4-8-10 or a 4-8-7. A 1000 pound application per acre of the 2-8-5 has given better returns than 500 pounds of any other fertilizer. It may be that a 4-8-10 will give better results for two or three years on the same piece of land, but over a long period of time phosphorus has been found to be the most essential. The heavy application of 2-8-5 adds twice as much phosphorus and about the same amount of potash and nitrogen as the other fertilizers. If more nitrogen is needed, a top dressing of a soluble nitrogen can be applied later. Our experimental results do not justify the use of a fertilizer for tomatoes which is extremely high in potash.

Discussion:

Nitrogen is the only element that should be used as a side dressing. The others give best results if applied before setting. Moderate application of fertilizers give best results if applied in the row, provided there is a good mixture with the soil so as not to cause root injury.

Heavy applications in the row cause less root injury on heavy than on light soils.

In four years of experimental work on alluvial soils in Delaware, the use of nitrogen has not given as much increase in yield as might be expected. Applications of phosphorus and potash have given almost as good results as nitrogen, phosphorus and potash.

In pot experiments being conducted at the University of Maryland to determine the effects of different elements in the growth of tomato plants, those plants which have received no magnesium appear very similar to those grown at the Experiment Station at Ridgely and on other poor soils in sections of the Eastern Shore.

Mr. Harry Kemp, winner of second place in the Maryland Ten Ton Tomato Contest in 1929, gave the following statements as to the manner in which he handled his crop:--

The land has been in cultivation for the past ten years. It was seeded to wheat, as a cover crop, in the fall of 1928, and this was turned under the middle of April when about six inches high. Approximately ten tons of manure per acre were broadcast; an application of 500 pounds of a fertilizer of unknown analysis and another of 500 pounds per acre of a 2-12-5 were broadcast and worked into the ground separately. The land was worked into good condition and the rows marked off. Another application of 500 pounds of a 2-12-5 was made in the row before setting. The plants, which were of the Marglobe variety, were grown in a cloth covered coldframe and were set May 14, 15 and 16. The first two cultivations were deep and close to the plants. Four other shallow cultivations were given during the season. About three acres, of the total eleven and a fraction, received a side dressing of 300 pounds of a 2-8-10 fertilizer. The entire field yielded at the rate of slightly over thirteen and a half tons per acre, and it is felt that the three acres which were side dressed, yielded close to twenty tons per acre.

Disease Hazards and Southern Grown Plants

by

T. F. Manns, University of Delaware, Newark, Delaware

Eighteen years of experience and research with tomato seed beds and disease transmission have proven to the writer that several of the most important diseases may be carried on the seedlings from the seed bed to the field. This is true of wilt, early blight, bacterial spot and Septoria blight. Wilt carries over extensively in the seed bed and the field.

Early blight, bacterial spot and Septoria blight carry over on infected vines. Although an intensive study has not as yet been made of how generally these diseases are carried with the seed, from evidence gained, it seems quite definite that any or all of them may be and frequently are seed-borne. An organism similar to that causing early blight has been repeatedly observed for the past 18 years in examinations of tomato pulp while making mould counts. The past season, five pounds of cannery-run seed known to be heavily diseased were purchased to learn through laboratory studies what diseases may survive seed treatment, using 1 to 1000 bichloride of mercury for five minutes. One of the common mould forms repeatedly survived the treatment. Plate cultures of disinfected seed showed this was internal of seed with brown spots, or lesions. None of the other diseases survived the treatment. This work should be repeated on a large number of samples.

Cooperative efforts on southern grown plants for a number of years, with Mr. Montell of the Campbell Soup Company and others, have shown that early blight is almost sure to be present, whether or not the seed is treated and plants sprayed or dusted. In 1929, in cooperation with Dr. Boyd of the Georgia State Board of Agriculture, some forty different strains of northern grown seed which had been variously treated (Also untreated) were grown in seed beds upon selected areas near Tipton, Georgia. Samples of these plants were grown under field conditions in Delaware. Careful notes on the seed bed taken by Dr. Boyd showed 80% of the sources had early blight before pulling. At ripening time under Delaware field conditions 97.7% had early blight. Dr. Boyd did not report the presence of nail head spot on the lots sent to Delaware, but this disease, which is not common in Delaware, was present here on 8% of the sources. Under Georgia conditions, 32.5% of the sources had bacterial spot and under Delaware conditions 35% showed the same disease. Dr. Boyd did not report the Grand Rapids (bacterial canker) disease on the sources sent, but it showed on 20% of the sources in the Delaware test. This infection undoubtedly came in on the plants and by way of the seed, as the disease is not common in Delaware.

Conclusions:- Seed sources are responsible for several of the diseases, especially the bacterial. Seed treatment (corrosive sublimate, 1 to 1000, then washed, and also Semesan) may have been some factor in control of the bacterial diseases, but it was not successful with early blight. Dr. Boyd says, in a report of a field test similar to that conducted in Delaware, "early blight developed out of all proportions to that represented in the seed source test, and became widespread in some of the fields". The writer is inclined to believe that early blight, nail head, and Septoria blight may become epidemic by wind-carried spores from southern regions. Dr. Stakman in aeroplane studies in 1922 of wind-borne spores shows that a type similar to that causing early blight was by far the most numerous.

Discussion: Led by E. W. Montell, Camden, New Jersey

Southern-grown plants have been used by the Campbell Soup Company for several years, due to demand of the growers for early plants. Because of the large quantity of plants used yearly, it has been possible to control the growing operations to some extent. All seed sown in 1929 were treated with mercuric chloride and were seeded fairly lightly in rows. There is an uncertainty about the amount of diseases that may be brought in on the southern plants, but the blights and collar rot are partially a handling problem. The first shipments usually have less disease than those which are received later in the season.

It has been found better to use 5/8 bushel baskets in shipping, with only 500 to 800 plants to the basket, than the larger crates which are generally used. Tight packing injures the stems and leaves and offers openings for diseases.

Some years the southern plants have been better than hot bed plants, and other years the reverse is true.

Shipments have been made in refrigerated cars. The disease infection has been less in these lots, but the plants do not stand up so well when planted in the field.

Some lots of plants have been grown in Texas under irrigation. These have been practically free from diseases.

Review of Tomato Crop Conditions, 1929

by

L. M. Goodwin, Denton, Maryland

The University of Maryland Extension Service is interested in promoting efficient production of all canning crops. It should be remembered that efficiency of production does not mean over-production. It is believed that growers will find it more profitable to produce the same number of total tons on a smaller acreage. The net profit will be larger and the quality improved. Both are important factors in view of the increasing intersectional and foreign competition and also the rapid increase in growing and marketing of fresh vegetables during winter months.

There are four main points of tomato production that are being emphasized by the Extension Service:-

1. Time of planting
2. Selection of a variety adapted to the particular section
3. Adequate fertilization
4. Proper cultivations

In regard to time of planting, it has been known for many years that the time of setting plants in the field has a direct influence on the yield. That is, the earlier set plants in

the majority of cases give by far the best yields. Two weeks difference in the time of setting have given differences of yield of as much as two to three tons per acre in favor of the earlier set plants. The results were secured in both field and experiment station tests. The cloth covered coldframe is recommended as a means of assuring the grower of plants for early field setting. Eight million plants were grown in coldframes in 1929 and, almost without exception, those using the method expressed satisfaction with results secured.

Three years of variety testing in all parts of Maryland where tomatoes are grown for canning have shown that the Marglobe variety is best for most of the Eastern Shore area, while the Baltimore types gave best results under Western Maryland conditions.

The average application of fertilizer in the State of Maryland is not more than 500 pounds per acre. It is fairly safe to say that this is not more than half enough. Soil fertility is without question the greatest single limiting factor in tomato production. It is important to supply the soil with humus by means of green manure crops or stable manure, and, in addition, it is usually profitable to use 1000 to 1500 pounds of a good grade commercial fertilizer. A 4-8-10 has been used on the Eastern Shore with good results. This is probably more potash than is necessary on Western Maryland soils. In any event, the exact analysis that will give best results will depend upon several varying factors of soil conditions.

There is every reason to believe that many crops, including tomatoes, which are otherwise well handled are ruined by excessively deep cultivation, especially during the later stage of their growth. Shallow cultivation should be the rule, at least during the later stages of the plant's development.

2:00 P. M. - SPECIAL VEGETABLE CROPS. Chairman, D. H. Stevenson, Baltimore, Maryland

Acid Soils and Crop Failures

by

H. H. Zimmerly, Norfolk, Virginia

The following shows the susceptibility of certain vegetables to injury on strongly acid soils:

More susceptible	Less susceptible
Spinach	Tomatoes
Beets	Sweet Corn
Carrots	Snap beans
Henderson Bush Limas	Peas

There are many factors linked with the principles of liming soils. The following shows the accepted system of indicating the degrees of acidity of soil:

PH 7 - neutral
PH 6 - slightly acid
PH 5 - strongly acid

Tests conducted with spinach at the Virginia Truck Experiment Station gave the following results:

On soil with PH 4.8 - plants died
On soil with PH 6.0 - best and most nearly normal development
On soil with PH 6.2 - development not as good as at PH 6.0

Acid soils are usually found to be low in phosphorus. It should be pointed out that too much lime, as well as lack of lime, causes crop failures. Soils that are alkaline from the application of too much lime are less productive with many crops than strongly acid soils.

Results of tests with lima beans showed that soils of PH 6.2 produced a good crop while the crop was a failure on soils of PH 5.0, indicating that soils with slight acidity are favorable for lima bean production.

The conclusions are that PH 6.0, or a slightly acid condition in the soil, is most favorable for the general production of all crops.

Methods for determining or testing soil acidity under practical field conditions:

1. The colorimeteric test is considered best for light soils.
2. The Morgan test is practical for general use and is found to be accurate.
3. The Truog test is recognized as a good method.

Every effort should be made in taking soil samples in the field to get a representative sample. It is recommended that ten samples of soil be taken from each acre and that these be mixed together in a common container from which should be drawn the composite sample. If there is much variation in the field, more samples should be taken.

To correct the acidity in a field having a test of PH 5.0, it is usually necessary to apply about one ton of hydrated lime per acre. It is considered best to lime soils before they become too acid, using moderate applications of about 1000 pounds of hydrated lime, or its equivalent, per acre. All forms of lime are found effective in proportion to their oxides. In any event, lime should be in a good mechanical condition.

The tests conducted with vegetable crops referred to were on Sassafras loam soil that would be comparable to soil conditions over a large area of Maryland, Delaware and New Jersey.

Lime is usually applied after plowing and before broadcasting the fertilizer and should be well mixed with the soil. It is not considered desirable to apply the lime before plowing, since it is necessary to have some of the material in the top few inches of the soil so that the seedlings or plants in the early stages of growth will be benefitted.

The soil reading for potatoes should not be above PH 5.5, or there will be danger of injury from scab disease.

Spinach and Other Greens

by

Fred W. Geise, College Park, Maryland

The turnip broccoli grown on the Eastern Shore of Maryland, Virginia and Delaware is not the true Italian green-sprouting broccoli but is a seven top turnip green. The early stages of growth in the late fall or early spring are marketed as turnip greens. Later, the seed shoots are marketed in somewhat the same manner as the green-sprouting broccoli.

Spinach - This crop grows best during the fall and spring and is suited to the same climatic conditions that are most favorable for production of cabbage. For the fall crop, the seed are sown around September 1st and the crop is ready for harvest about October 10th. Best quality fall spinach usually results from late planting with a harvest about November 1st.

Fall crop - Plant September 1st to October 10th
Harvest October 10 to December 1st

Winter crop - Plant September 25th to October 10th
Harvest late March to April 15th

Spring crop - Plant March 20th or before
Harvest latter part of May

The fall crop is considered easiest to handle, due to the longer season of harvest.

Spinach variety tests conducted in Maryland have shown that the Virginia Savoy is best for fall and winter planting. This variety is also resistant to the yellows. For the spring crop, King of Denmark and Bloomsdale (long standing) have given good results. A very fertile soil is required for successful growing of this crop. The soil should be of garden richness. 1500 pounds of fertilizer rich in nitrogen, such as a 9-8-3, is usually applied broadcast and the crop is later side-dressed with nitrate of soda, to which pulverized sheep manure has been added to prevent burning or injury to the foliage. Spinace may be planted either broadcast or in rows. If the ground is weedy, cultivation will be necessary, so in this case the seed will have to be planted in rows. Cultivation should be shallow. The depth of planting for the fall and winter crop should be from one-half to three-fourths inch; for the spring crop, the seed should be barely covered.

Asparagus - Growing, Costs and Returns

by

A. D. Radebaugh, Baltimore, Maryland

The trade prefers the green asparagus, which is mainly produced in the Eastern United States. California is at present packing the bulk of the asparagus canned in the United States, and this is mostly white, due to the growing conditions during their season of production. Frost occurs nearly every night during the cutting season, so the rows are ridged and the shoots cut before emerging from the soil. California has made some attempt to produce green asparagus but has not met with much success.

Plenty of capital is needed to get started in producing asparagus. It is estimated that it costs $200 to $ 250 per acre to bring asparagus to the harvesting stage. A good soil type is very desirable. It should not be stony, as this causes crooked growth. A reasonably light soil is desirable, although the crop is produced on practically all soil types.

Good selected roots are necessary and will prove profitable. It is usually considered cheaper and most desirable for the grower to produce his own crowns. Use nothing but one-year old crowns or roots. Crowns should not have more than 5 or 6 buds as those with large numbers of buds usually produce small shoots which are not profitable. A canner who is considering packing asparagus should plan to control his own acreage. Judging from past early season markets, the first part of the crop would probably have to be sold on the fresh market and the canning done during the latter part of the season, when the fresh market is low enough to justify canning.

Mary Washington is considered the best available variety.

Fertilizer: Heavy applications of commercial fertilizer are necessary. It is considered best to depend on commercial fertilizers rather than manure for maintaining fertility, due to the weed growth resulting from the use of the latter. A fertilizer composed of nitrate of soda, sulphate of ammonia, acid phosphate and muriate of potash has been found to be desirable. Some of the most successful growers use amounts in excess of one ton per acre annually. Some apply one-half of the fertilizer in the spring and one half after the cutting season is over. However, T. H. White reported that experiments conducted at the Maryland Station showed no difference when all of the fertilizer was applied in the spring in comparison with applying all after the cutting season. Therefore, it would seem advisable to make the full application in the spring before cutting season starts.

Distance of Planting: A good planting distance is five feet between rows and two feet in the row. Too close planting has resulted in over-crowding of the crowns in the later stages of growth and is not desirable from the standpoint of long-time production. The crowns are usually put in a furrow 8" to 9" deep and are gradually covered as the top growth develops.

In order to get practical control of the asparagus beetle, it is absolutely necessary to spray or dust the crop while the top growth is being made before the field comes into bearing, or when the top growth is being made following the cutting season. If beetles are allowed to multiply on the plants during late summer they are apt to be present in large numbers the following spring and to do considerable damage to the young shoots. There is no practical means of beetle control during the cutting season. Calcium arsenate used as a spray or dust is effective after cutting season. The previous year's growth should be removed from the field or burned in small piles between the rows as a further control measure.

When the size of the shoots begins to run down, cutting should stop. T. H. White suggested the use of nitrate of soda as a side dressing during the cutting season.

Squash and Pumpkins

by

E. G. Cover, Easton, Maryland

These crops usually follow peas and are put in a few days after the pea crop is harvested. No commercial fertilizer is used, but furrows are opened up and compost put in the hill. Boston Marrow is considered the best variety of squash. The plants are thinned to about two or three per hill. The yields range from four to eight tons per acre. Eight tons is considered a good yield. The regular bean beetle dust (20-20-60) is used to control insects.

7:00 P.M. - GET- TOGETHER DINNER

Greetings - R. A. Pearson, President, University of Maryland

"The Canner and the College" - Ralph O. Dulany, Vice President, Tri-State Packers' Association

"European Adventures" - H. J. Patterson, Dean and Director, College of Agriculture and Experiment Station.

WEDNESDAY, FEBRUARY 19th

9:00 A. M. - PEAS Chairman, F. Hall Wrightson, Easton, Maryland

Tri-State Canning Practices

by

F. M. Shook, Easton, Maryland

(Because of the singular manner in which this subject was presented, it is given here practically in its entirety.)

Peas suffer from the law of gravitation to a greater extent than any other fruit or vegetable in preparation for canning. In the viner they are subjected to numerous mechanical blows, any one of which would put the best trained athlete out for the full count. Forced into the maw of this mechanical bruiser, commonly called the viner, they are started on the long devious road to the can, described as "from the vine to the can in a day, and how."

In preparation for canning and filling into the can, each pea is subjected to no fewer than fourteen drops through space at least forty-five times its diameter. This would be similar to putting a man down a flight of fourteen stairsteps, each step having a fall of sixty five feet. The peas that escape destruction after making seven of these trial test falls are given special treatment known as blanching. This is done possibly with a view of softening them so that the next seven times that they are dropped a distance of at least forty-five times their diameter may completely ruin them. One might imagine the production man looking over the peas after they have made the fourteen falling tests and saying to himself, "Well, darn you, if I can't destroy you I'll can you". So they go into the cans - a sad lot, bruised, split, bursted, stewed, draggled and faded. Paraphrasing the poem on "How the Water Comes Down at Ladore", we might ask, "How do peas come down to the cans?"

They come slamming and rolling and bruising and breaking,
And slanting and glancing and bouncing and bursting,
All at once with a bang, they fall into a pan;
And that's the way peas come down to the can.

But how do they come out of the cans? We are surprised to find some of them split, some bursted, and perhaps some cloudy liquor in the can. Then, individually we set about to overcome these defects by tampering with the time and temperature of blanching and processing. We are practically uniform in our fourteen falling tests, but there is a wide variation in our time and temperature of blanching and processing. Some increase the blanch as peas become older, others decrease the blanch as peas become older, until we find one canner blanching ten times as long as another. They are both trying

to get tender, unbroken peas with clear liquor.

Would the quality of our peas be improved if we handled them more promptly from field to can? Should we handle the peas at least as carefully as we do the empty cans? Should we increase or decrease the blanch as peas become older? Should there be more uniformity in our process time and temperature? A survey of blanching and processing which covered 90% of Tri-State Canners in 1929 showed the following wide variations:

Blanching

At 190 degrees, 2½, 4, 5, 5½, 8 and 9½ minutes
At 200 degrees, 5, 5½, 7, 9, 10½ and 15 minutes
At 210 degrees, 4, 5, 6, 8, 9 and 12 minutes
At 212 degrees, 1½, 3, 4, 5, 6, 7 and 10 minutes

Processing

At 238 degrees 25, 28 and 30 minutes
At 240 degrees, 19, 21, 22, 23, 24, 25, 26, 28, 30 and 40 minutes
At 242 degrees, 25, 26 and 35 minutes

Discussion:

The most important consideration in canning quality peas is to have sufficient equipment to handle the crop at cutting time. The crop from a given field may have a very good flavor if canned immediately and be of very poor quality if held for as short a time as four hours. The skins begin to harden and toughen almost as soon as the vines are cut. The use of hard water also causes the skins to toughen.

The National Canners' Association has put out recommendations for the time and temperature of processing: 40minutes at 240 degrees, 30 minutes at 245 degrees, and 20 minutes at 250 degrees. There seems to be an advantage in the use of the higher temperatures.

Peas should not be cut if they cannot be canned immediately. The quality decreases faster if cut than if left standing in the field.

A method of conveying by water has been worked out in some canning plants. This would tend to overcome some of the rough treatment in handling by hand, but the excessive use of water washes out the color and sugar and decreases the quality.

There was much discussion as to whether peas should be kept dry or in water if it is necessary to hold them for any length of time before canning. The consensus of opinion seemed to be that it is better to hold them dry, in thin layers, well aerated. Holding in water tends to lower the flavor.

The graded size of samples has been used as a basis for determining the best time to cut peas, using the temperature for calculations. At 80 degrees average temperature, #1's turn to #2's at the rate of 1% per hour. This might be used where futures have been sold by grades.

Sweet Varieties for Maryland

(Neither the speaker nor the discussion leader could be present, but the quotations below, taken from a letter sent by Mr. N. H. Fooks, Preston, Maryland, give the results of considerable experience.)

"I have tried sweet peas twice at our Mount Airy plant, each time using the Horsford variety. The first season was rather wet and not very warm and they matured fairly well. The next season was quite warm and they were almost a failure. I only grew about an acre each time at this plant.

"I have been packing sweet peas in Garrett County for about five years. The first year we suffered considerable damage from lice, possibly 25%. Two other years we had an average crop. Last season we almost lost our sweet pea crop on account of the dry and hot weather which was ideal for the louse. We did not get over 25% of a crop of sweet peas. Our Alaskas were not damaged by the louse at the same plant, coming off before the great host of lice developed.

"At our Mountain Lake plant we have tried about all varieties, including the following: Surprise, Horal, Canners Gem, Admiral, Horsford and Perfection.

"The Surprise have given us trouble with root-rot and we have not been very successful in getting a good stand of them. They are a very nice grade of pea, but coming off almost at the same time as Alaskas.

"We have about settled down to the Perfection variety and shall plant no other variety this year.

"We do not believe that sweet peas can be grown successfully on the Eastern Shore, or in the present pea growing belt of Western Maryland, such as Frederick, Carroll or Harford Counties. And a sweet pea to be marketable must be tender. They pass from the tender to the hard stage quicker than the Alaska pea.

"On a trip through Wisconsin last summer I noticed most of the canners were harvesting their sweet peas when they were about two-thirds grown, thus insuring them a very nice pea.

"Whether sweet peas can ever be grown successfully in the mountain section of Western Maryland I think is marked for trial, as they seem to be a special mark for the pea aphis or louse. When the season is hot and dry, Alaskas generally

escape the ravages of the louse on account of being earlier, while the sweets the same season may meet with almost complete destruction from the pea louse, as our experience last season proved."

Discussion:

Those who have tried sweets in this section have generally not received quite as good results as with the Alaska. Some have had very good yields, however, particularly with the Surprise variety. The sweet varieties mature more rapidly than Alaskas and must be cut and canned at the proper stage or the quality will be very low.

Testing Seed Stocks

by

D. N. Shoemaker, U.S. Department of Agriculture

Improvements in refrigeration are having considerable effect on the canning industry in this country. Fresh peas may now be shipped for long distances and still be in good condition when they reach the markets. In 1927 Mexico shipped half as many fresh peas into this country as were canned in Maryland that year. This trend means that the canner of a low-quality product is going to be hit first, and this in general means the canner of Alaskas. The canner of the Surprise variety will not feel the effect so soon.

Big improvements have been made recently in the seed trade. Comparatively few years ago many fields had large percentages of purple blossom plants, or rogues, and the Tri-State territory probably had the worst seed lots of any section of the country.

Alaska needs testing worse than any other variety because they are so many bad strains of Alaska. Three states have attempted to test seed stocks: Maryland, New York and Wisconsin. Samples of seed lots have been secured from canners and seedsmen and planted by numbers in test plots. Seedsmen are sent a full report of the results, with their samples checked or named. New York has gone farther and given all names of canners and seedsmen with the results of the tests. A test of this kind gives the canner a come-back with the seedsman if a particular lot of seed should turn out bad. Weather conditions have no effect on the behavior of a sample, as compared to other lots in the same test.

There are objections to such a test. One is that the experiment station, or other agency making the test, might be involved in court action which would be undesirable from a State standpoint. Another objection is the variation that might occur in drawing a sample, possibly resulting in some unfairness.

Discussion:

A pea similar to the Alaska is most logical for Maryland conditions because of its early maturity before the pea aphis becomes serious. The aphis is so serious on later varieties that most sweets cannot be successfully grown here. Surprise seems to be the most desirable sweet variety for this territory, because of its early maturity. One of the parents of this variety was Alaska. It could not be grown with Alaska, because of the close dates of maturity, but it might be substituted if it is found to yield sufficiently well. Surprise is a new variety and there is considerable bad stock at the present time, but improvements are being made rapidly.

The rate of planting Surprise should be heavier than for Alaska. From five to six bushels per acre have given good results in trials in Maryland.

Factors Influencing Quality and Yield

by

C. G. Woodbury, Washington, D. C.

(The following statements made by Mr. Woodbury were taken largely from a progress report issued by Mr. C. B. Sayre, Geneva Experiment Station, New York. The results are not given as finished experiments and are to be considered for New York conditions.)

Effect of Form of Potash on Yield and Quality: The form of potash used made very little difference in quality of the canned product. All three forms hastened maturity. The conclusion is that there is insufficient proof that any form of potash makes hard peas in the can. These results are for one year only.

Rate of Seeding: Plantings at the rate of five bushels per acre have given largest net returns. Varieties used were Alaska, Surprise and others.

Seed Treatment: In tests with organic mercury compounds, it was concluded that seed treatment does not control all diseases, but that the germination and yield is increased sufficiently to pay for the cost of treatment.

Inoculation: There was sufficient natural inoculation under conditions of the experiment that it was not necessary to use artificial inoculum. Inoculations and seed treatments cannot be made on the same lots. The treatment will kill the inoculum.

Planting Dates: All canning varieties may be planted as soon as the ground can be prepared. This includes the sweet varieties as well as Alaska. Ascochyta blight becomes serious late in the season and early plantings partially escape damage. However, the seed corn maggot was present during the past season and severely injured early plantings.

Breeding Work: This work is progressing but no report can be given at this time. Other breeding work is being carried on at Wisconsin.

Seed Lot Test: The test was a failure and no results were secured this year because of the seed corn maggot injury.

Rotation Experiments: Some five-year rotations have been shortened to four years. An effort should be made to build up the humus content of the soil with green manures and cover crops. Where peas have been grown for four years successively, the crop was unprofitable the third year and was a failure the fourth. The four-year rotation has been successful. Where fall plowing was practiced, successive plantings of tomatoes compared favorably with rotation.

Fertilizer experiments on heavy clay soils have shown little response to any treatments. Only light applications would seem advisable under these conditions. The germination of both beans and peas is likely to be seriously injured if the fertilizer is drilled with the seed, particularly in a dry season.

Factors Influencing Quality and Yield

by

V. R. Boswell, U. S. Department of Agriculture

A study of soil acidity, nitrate content and organic matter content was made to determine some of the factors which might influence the uneven growth observed in many fields. The organic matter content seemed to be more nearly correlated with stand and yield than the other factors. The results show that nodular formation is better in fertile fields, and in the best spots in given fields, than on poorer soils. In other words, the best nodular formation occurs on the plants that have made the best growth, or vice versa.

In fertilizer tests, nitrogen has given better results than either potash or phosphorus. The use of a 5-8-5 analysis has given more profitable returns than the commonly used 2-8-4 or 2-8-5. There is some evidence that a 7-6-5 gives even better returns, but the experimental work has not progressed far enough as yet to make the recommendation. From 300 to 400 pounds should be used per acre, on the average soil.

Potash has not given consistent results in either yield or quality. It has caused very little difference in the time of maturity or in the hardness of peas.

Time of Planting: Within reason, peas should be planted as soon as the ground can be worked into good condition in the spring. In some seasons, as much as 50% decrease in yield has been obtained for a delay of ten days in planting.

Depth of Planting: Plant as shallow as possible to get germination. From one and one-half to two inches should be deep enough in soils with considerable moisture.

Effect of Size of Seed on Maturity and Yield: The yields have been about the same for large and small seed, when equal weights of the different sizes were used. Most seed lots are graded fairly uniformly for size and it is hardly worth while to regrade them. In most commercial lots of seed, there is very little difference in the time of maturity of the large and the small seed.

Effect of Temperature on Quality: Late sown peas are not necessarily of poorer quality when canned than early planted crops, if harvested at the proper stage of maturity. High temperatures shorten the proper harvesting period, however, and it is harder to get a late crop cut at just the right stage.

Discussion:

Probably more potash is required on the Eastern Shore than in the Piedmont region.

The nodular organism will not live long in an acid soil.

Crops from seed that is not inoculated mature somewhat earlier than those from inoculated seed.

A good practice in making the inoculation is to mix the inoculum and seed in tubs just beforepouring into the drill. A barrel outfit, similar to that used in treating wheat for smut, has been used effectively in some cases for mixing. There should be no baffle board inside the barrel, however.

A disk drill is better than a hoe drill for planting.

A spike-tooth harrow behind the drill gives better results than a roller. The teeth should be turned back. There may be some trouble in getting the seedlings through the ground if a roller is used.

2:00 P.M. - CORN. Chairman, Edwin Warfield, Jr., Baltimore, Maryland.

Progress in Breeding and Variety Improvement

by

W. B. Kemp, College Park, Maryland

There are three general lines of work being conducted at the Experiment Station at the present time: (1) Variety tests, (2) strain selections and (3) hybrid breeding.

In the variety tests conducted, the State-grown strains have given slightly higher yields than strains from other sources, but there is a tendency for the kernels to become shallow after being grown locally for a few years. This condition is no doubt due to the lack of proper care in making stock seed selections. It has been found that all desirable characteristics can be maintained in locally grown seed if proper selection work is carried out. A probable reason for the kernels becoming shallow under local conditions is that the ears having shallow kernels usually dry out best, and consequently have a higher germination than ears with deep grains. Also, the shallow grained ears do not mold as badly as those with deep kernels, and there is a tendency to select the better appearing ears. The narrow grain strains and varieties usually yield somewhat less than those with wider kernels.

Work with inbred strains and first generation crosses has not been attempted on a very extensive scale in Maryland. Results of the work that has been conducted are very encouraging. First generation crosses grown in Connecticut and Indiana have been tested in Maryland and have not given as good results as could be desired. Some of these crosses have been very susceptible to root rot injury.

Special attention has been directed recently to developing the Hopeland selection. This is a selection from a cross between sugar corn and field corn which originated at the Maryland Station about ten years ago. Samples have been put out for trial purposes with a number of canners in the State. About 500 acres were grown in 1929 and there is enough seed for approximately 3000 acres this year. This strain has outyielded other straight selections in tests and has appeared favorable under field conditions. The proportion of cut corn has been above the average. Tests to determine the relative tenderness of the pericarp have indicated that the variety possesses the desirable quality of tenderness, but some canning tests and observations under field conditions have indicated otherwise. This is probably explained by the fact that this selection should be pulled from the stalk at what appears to be a slightly earlier stage of maturity than the other common canning varieties. Hopeland needs slightly more sugar added in the canning process than is ordinarily used for most varieties. It has a deeper and narrower kernel than Stowells Evergreen and is about a week later.

The principal effort in sweet corn breeding work in the United States is being given to production of first generation crosses. Good progress is being made and seed should soon be available in commercial quantities. The intricate methods required for breeding and production will always be a serious difficulty with this type of seed, however.

Fertilizers for Sweet Corn

by

J. E. Metzger, College Park, Maryland

Experimental work is being carried out to determine the method of application and the rate and analysis of fertilizers that will give most profitable returns under Maryland conditions. Test plots to determine the rate of application and the analysis were conducted in 1929 at Easton, Westminster and College Park. The following ratios and analyses were used in these tests:

Ratio	Analysis	Ratio	Analysis
1-1-1	5-5-5	1-3-1	5-15-5
1-2-1	5-10-5	1-4-2	3-12-6
1-1-2	5-5-10	1-6-2	2-12-4
1-2-2	5-10-10	3-4-2	9-12-6

Results of these tests are for only one year and no definite conclusions should be drawn from them. However, in 1929 the 3-12-6 analysis gave best results and the 5-10-10 made the poorest showing.

The rates of application were 200 lbs., 400 lbs., 600 lbs., 800 lbs. and 1000 lbs. per acre. The application of 1000 lbs. gave the largest total yield of corn, but the 400 lbs. application gave the largest net returns.

Method of Application: Most of the experimental results on the method of application have been secured in the northern states and these probably would not be representative for Maryland conditions. Cool weather conditions, such as are prevalent in the northern states, cause slow nitrification, while in Maryland the temperature is relatively high over a period of seven or eight months and nitrification is rapid. In view of these conditions, the northern growers can probably get full benefit of their fertilizer when all is applied broadcast before planting. Maryland growers would no doubt get higher returns if the phosphorus and potash were applied broadcast sometime before planting and the nitrogenous materials were applied as a side-dressing in the row. In order to prevent burning from either nitrate of soda or sulphate of ammonia, a small quantity of acid phosphate could be mixed with the nitrogenous fertilizer. Seasonal conditions have a great influence on the results secured from fertilizer in any given season. This is especially true of nitrogen in seasons of early heavy rainfalls that cause a rapid leaching of this element. A new special fertilizer distributor has been put on the market and has been used with excellent results for row applications. It is seven feet wide and can be set for very accurate applications. This machine will sow accurately amounts of fertilizer varying from 35 to 1000 pounds.

The following table shows the results of broadcast and row application tests over a two year period:

TREATMENT	Yield per Acre Tons					
	1928		1929		Average	
	Broadcast	In Row	Broadcast	In Row	Broadcast	In Row
Nitrate cks	3.60	3.35	2.14	2.27	2.87	2.81
Nitrate in 2 applications	3.76	3.66	2.29	2.62	3.02	3.14
Nitrate (tankage)	3.25	3.44	2.54	2.16	2.89	2.80
Nitrate (urea)	3.17	3.67	2.06	2.17	2.62	2.92

Production of Quality Whole-Grain Corn

by

Henry Whiteford, Whiteford, Maryland

The following discussion deals with practices that have been used in commercial production of Shoepeg corn in the vicinity of Whiteford, Maryland.

Seed: Home-grown seed has been used in the production of the canning crop each year and has been found to give better yields than seed brought down from the northern states. Numerous difficulties are encountered in the home saving of seed, particularly the danger of crossing with field corn in this community. In order to overcome this difficulty, stock seed on the ear has been bought each year from Connecticut and this has been used to grow the general seed supply for the canning acreage the following year. A question was raised concerning the advantage of such a procedure. It seems doubtful if seed would become acclimated in one year.

Grading Seed: All corn planted on the Company's land is graded for size, while that given the contract growers is ungraded. This policy is followed because of the difficulty of getting contract growers to pull and deliver their crop promptly at the proper stage.

Seed Treatment: Experience with seed treatment with the organic mercury compounds has been that it has very little effect in increasing the yield. It has been of some aid in protecting the plantings from ravages of crows and has helped somewhat in seeding also. The small kernels of the Shoepeg variety make it difficult to plant thin enough and the treated seed seems to feed through the planter at a slower rate.

Planting Distance: On good ground, Shoepeg may be planted 28 by 36 inches. It is usually planted in hills, not checked, and two stalks are left to the hill. A planter equipped to

spread the hill more than is possible with the present machine would be desirable from the standpoint of thinning. Close planting is an advantage in that the plants shade the ground and prevent the evaporation of soil moisture. One bushel of seed is allowed for each five acres planted.

Fertilization: An application of about 400 pounds of a 4-8-7 fertilizer is broadcast and another application of from 150 to 250 pounds is put in the row at time of planting. A side-dressing of the same analysis fertilizer is usually given at the third cultivation. Discussion arose at this point in regard to the use of a complete fertilizer as a side dressing. The general opinion seemed to be that a quick-acting nitrate fertilizer would be fully as effective and more economical. In making up the formula for the 4-8-7, about one-fourth of the nitrogen is derived from nitrate of soda and the remainder from the slower acting materials.

A case was given at this time of severe injury that had resulted from a side-dressing of nitrate of soda during the later stages of cultivation.

Cultivation: A light harrow is considered desirable and economical for cultivation before the corn is up and for the first one or two workings after the corn has come through the ground. Many fields of corn have been ruined by deep cultivation. About six cultivations and one hoeing are usually given the crop.

Discussion:

Some of the graders commonly used are not entirely satisfactory in that they do not grade the seed close enough. The larger kernels should be used for the first plantings. Use of the butt grains for planting has not been very successful.

As far as is known, the Shoepeg and Country Gentleman had the same origin, but the Shoepeg is a further selection for a small-kernel type within the variety.

Removal of suckers has not been found to be beneficial or profitable.

Reducing Production Costs

by

S. H. DeVault and W. P. Walker, College Park, Maryland.

There are two general methods of increasing profits: the first is by raising the price paid for the commodity, and the second is by reducing the production costs. The first method is apt to stimulate over-production and usually results in disaster. It is impossible to raise the price high enough to cover the cost of all individual producers. Two methods of decreasing the cost of production are by increasing the yield per acre and by the utilization of the by-products.

Few producers have even approached optimum yields, and there is opportunity for much improvement along this line. Surveys of production costs in the State show that net profits increase with yields. A consistently high yield is necessary for profit. Activity should be centered on a definite production program based on the best available recommendations.

There are three groups of farmers as shown by the recent survey; the first group is composed of those getting consistently high yields; the second, those getting consistently low yields; and the third, the inconsistent producers. The latter group usually results from an inconsistent policy of operation. It was found in all cases that those growers who were in the first group had adopted a good production program.

Profits may be increased by decreasing the growing costs. There are certain fixed costs, represented by taxes, seed and machinery which cannot be reduced. There are also certain optional costs, as the amount of fertilizer, lime and manure applied. A third group of costs might be referred to as control costs. These can be kept down through the efficient handling of labor and the use of labor-saving machinery. Such machinery is usually best adapted for use on large acreages.

Some crops, due to their nature of growth, require a large amount of labor, and the possibilities for reducing the cost of production from this standpoint are very limited. With crops of this kind, an increased yield per acre is the only solution.

In general, increased profits result from increased yields and decreased costs of operation.

THURSDAY, FEBRUARY 20th

9:00 A. M. - BEANS. Chairman, S. H. Shriver, Westminster, Maryland

Lima Bean Seed Troubles, 1929

by

L. L. Harter, U. S. Department of Agriculture

A marked lack of germination of lima bean seed was reported early last spring. It was first thought that this might be due to one or more of three possible causes; (1) the cold, wet season, (2) injury by the seed corn maggot, or (3) injury by bacterial blight disease. However, no blight was found in the lima bean seed areas in California, and the other two possibilities did not seem probable.

A number of samples of seed were collected by Mr. W. A. Whitney and germination tests run, both in the laboratory and in soil in the greenhouse. A large percentage of cracked seed

was found in most of the lots. The percentages in six lots were as follows: 81%, 52%, 67%, 50%, 6% and 11%.

Cracked seed may produce good plants, but the tests showed that the percentage is lower than when normal seed is used. The seed injuries varied from slight cracks of the seed coat to mutilation of the embryo. Many seed that will germinate in a germination test will not produce plants under field conditions.

It seems that cracking might be caused by a speeding up of the threshing cylinders. It is also probable that the dry condition under which the seed are threshed is responsible to some extent for the injury. Practically all the seed in California is saved at a time when the temperature is high and the humidity low.

Many apparently good seed selected from badly cracked lots germinated very poorly, so it seems that some factor, or factors, other than the physical injury, might be partially responsible for the low germination. These causes are not yet known.

Discussion: Led by F. M. Clark, New Haven, Connecticut.

Injury to lima bean seed is the most perplexing problem that has confronted the seed industry in recent years. The lima bean seed is very delicate and might be injured by a number of causes. Threshing injury seems to be directly responsible for a good part of the trouble, but back of this is the relationship of the moisture content. The bulk of the seed produced in the last few years has been grown in very hot regions in California and Colorado, and the seed has probably been too dry when threshed. All precautions are being taken by the seed industry to prevent physical injury.

It does not seem probable that the failure to germinate is due directly to excessively high temperatures.

The bean crop might be injured by fertilizer practices, but fertilizer is rarely, if ever, used in the seed-producing areas. A good portion of the acreage in Maryland is grown after peas and is not fertilized.

Cylinders in the threshing machines were run slower than usual during the past season. In some places a machine with two cylinders is being used. This allows a slower speed than is possible with one-cylinder outfits.

Seed Borne Bean Diseases

by

H. A. Hunter, College Park, Maryland

There are three seed-borne diseases of beans of economic importance in Maryland. These are anthracnose or "pod-spot", bacterial blight and mosaic. There are, likewise, three very important considerations in control practices: (1) the rotation

of bean land, (2) the use of disease-free, western-grown seed, and (3) avoiding the spread of the diseases in the field, particularly when the plants are wet with dew or rain.

Anthracnose causes the typical pod-spotting which is familiar to most canners and growers. It causes also a discoloration of the stems, seed and veins of leaves. The disease is caused by a small plant, known as a "fungus" and commonly referred to as a "mold". It is similar to those which occur on moldy ears of corn. Small seed, referred to as "spores" are produced in large numbers under favorable weather conditions. It is definitely know that the disease may be carried over from one season to the next in infected seed. The results of incomplete experiments indicate that it may live over in infested soils, also.

In very dry seasons, anthracnose causes very little damage, but in wet, cool periods it may spread over a large field planting in a very few days. Infected pods have been ruled as unfit for food by the pure food and drug authorities, and canned beans that contain any measurable amount may be condemned. In very dry periods, the spores, or seed, of the organism are held firmly in a mucilaginous substance and there is very little danger of spread in a field. In a wet season, however, this substance swells and the spores are loosened, so that any object which touches the plant may become contaminated and spread the disease to healthy plants. For this reason, it is advisable to delay cultivation and picking, in so far as possible, until the vines are dry.

It has been found by tests and field surveys that bean seed grown in the dry sections of the West are not infected with anthracnose. Idaho and Colorado are the chief western sources of commercial quantities of the varieties grown in this State.

Results of tests, which are not as yet complete, indicate that the organism causing anthracnose may live over from one season to another in the soil under Maryland conditions. The length of time that it will survive in a given field is not known, but the indications are that it will live for more than one year.

The next most important disease in this section is bacterial blight, which appears chiefly as a leaf spot. In some cases it causes pod spotting and stem girdling, also. As the name indicates, it is caused by a bacterium, similar in some respects to the germs of human diseases. The disease is carried in the seed and will live over in the soil. It is favored by considerable moisture and a relatively warmer temperature than that under which anthracnose is most serious. Seed from practically all sources are apt to be infected with the organism. Although the disease has not been of such great importance in Maryland, the bean land should be rotated with other crops and precautions should be taken to not spread the disease in the field.

Mosaic is the third seed-borne disease which causes some damage here. The losses have been very small in the past, and these have been almost entirely on the Refugee variety, which is very susceptible. Seed from some of the Western states is very heavily infected with the disease, but it is considered desirable to use the seed from these sources in order to avoid anthracnose, which causes much more damage.

Discussion: Led by W. J. Zaumeyer, U.S. Department of Agriculture

The following report of the bean disease situation in the seed-producing areas of the western United States in 1929 was given by Dr. Zaumeyer:

Colorado: Anthracnose was not observed in Colorado, nor in any state west of Colorado. Even the planting of infected seed resulted in healthy plants. Very little blight occurred in 1929, probably due to the very dry season. In some seasons it is one of the biggest factors in production. There was some mosaic, but the injury was relatively unimportant.

Wyoming: Most of the seed produced are of the wax varieties. There was no anthracnose and very little if any bacterial blight. Mosaic occurred on the Refugee variety.

Montana: The seed acreage is increasing in this State. Bacterial blight was found, but caused very little damage. Anthracnose was not observed. Mosaic occurred to some extent on Refugees.

Idaho: Anthracnose and blight apparently do not occur in the seed-producing section in any years. Because of its freedom from blight, some seed companies get their stock seed from this section each year. Mosaic, however, is always serious.

California: The acreage is small, because of the high price of land and the more profitable returns from other crops. Anthracnose and blight were not observed in 1929. Mosaic occurred to some extent, but was not as serious as in southern Idaho.

Expressing the situation from the standpoint of diseases, bacterial blight was not found in Idaho and California; sparingly in Wyoming, Colorado and Utah; and slightly more abundantly in Montana. Anthracnose was not observed in any of these states in commercial acreages. Mosaic was distinctly more widespread than any of the other bean diseases. It was very prevalent in southern Idaho, but less widespread in Colorado, Utha, Wyoming, Montana and California. It appeared to be more abundant in Colorado in 1929 than in 1928.

Experience in Mexican Bean Beetle Control in 1929

by
Ernest N. Cory, College Park, Maryland

Three main lines of work were undertaken last year in connection with the Mexican bean beetle situation; first, to acquaint the growers with what had been done and to give them an idea of the solution of the problem; second, to get data on actual control operations under field conditions, including the costs of operations; and, third, to try out insecticides and methods in test plots that had not had a full trial in this State and to arrive at a definite decision as to the value of the different materials and methods.

Three editions of a circular and two editions of an information card were used in the first endeavor, but the main dependence was put upon the spoken word in a series of 21 meetings attended by 1800 people. Mr. Sanders conducted most of these meetings, in all parts of the State and spoke to over one thousand interested growers. The reception which this program has been accorded is probably without parallel in the State and the canners and growers are to be congratulated on the energy with which they took hold of the problem.

A large number of fields were gone over in detail, making all records possible before and after spraying and attempting to get some costs, which were very difficult to secure.

The general impression and some of the figures of the spray operations as carried out by the growers are given here.

Where spraying was done timely and thoroughly, it gave better results than dusting. The operations, of course, must be timely. Sprays must be thoroughly applied to the under surface of the leaves to give best results. On the other hand, by dusting with 20-20-60 mixture of monohydrated copper sulfate, calcium arsenate and lime, many growers were able to get an extremely good crop of beans. The conditions for dusting were very favorable and results might not be so good another year, but one must remember that there are occasions and places where spraying is wholly impracticable and dusting is the only method that is available. Under those conditions the grower must go ahead and get control as best he may. Results of spraying show that the application of a spray will reduce the infestation very measurably, but will not give, in any case, complete control. The infestation just prior to spraying or dusting ran from 6.2% to 11.3%. Either spraying or dusting reduced the infestation to approximately 3% infestation. Spraying held the infestation at or about this point longer than dusting and therefore the infestation on dusted fields at the time of the second picking was usually greater than in sprayed fields at the same time, unless a second application had been made.

The costs of spraying and dusting were decidedly variable. Where the costs of supervision, interest and depreciation were added, the cost ran up to a figure that is rather startling. When they were not included and only the items of labor and actual material used were considered, the figures look a little more reassuring. The highest cost, based on the above factors, with twenty pounds of dust at 8½¢ was $3.47 per acre. Using the same factors for spraying, but using Bordeaux and calcium arsenate at a very low rate, gave a cost of $1.97 per acre.

The average cost of dusting three fields of from 1 to 7 acres, using the copper arsenic lime dust at 20 lbs. per acre, was $2.91. Dusting 2 fields of 10 to 14 acres, using 14½ lbs. per acre of the above dust, cost $1.07. In another set of figures, the cost of dusting 241½ acres, using a traction duster and 18 lbs. per acre, was $1.524 per application; and 80 acres of stringless beans dusted with a power duster, using 19 lbs. per acre, cost $1.501 per acre per application. In these operations three mixtures, varying from 10 to 20 lbs. each of copper and arsenic were used. Spraying fields ranging from 1 to 14 acres, using 3 lbs. of magnesium arsenate per 100 gallons, cost $1.78 per acre.

The costs of dusting were generally higher than the costs of spraying. Most people used twenty-five or more pounds per acre, some used as low as eleven pounds per acre, so that there was a wide variation in the cost of applications of dust.

As to the third item, a determination of the value of new materials and new machinery was made in plots at several places. The first plots were designed to determine whether materials could be used to render the products safe. The second plot was designed to determine the value of some mixtures that were being offered to the public. In spite of the fact that we limited our recommendations to only a few materials, there were many mixtures offered. The tests indicated that sprays were slightly more efficient than dusts. From the standpoint of control, calcium arsenate sprays and dusts appear to be more effective, if plant injury is not considered, than magnesium arsenate. The addition of Bordeaux to sprays and copper sulfate to dusts appears to be of considerable advantage in reducing injury.

In no case did spraying with Epsom Salts solution have any value. Other results ran all the way from that to very complete control. Pyrethrum gave poorer results in these plots than was expected. However, field tests by growers gave excellent results. Pyrethrum should only be used when a substitute is needed for an arsenical for use after the pods have formed. At this time the fact should be driven home that one case of arsenical residue is going to knock the market sky high. Operations with arsenic must be stopped when the bean pods form. An attempt is being made to try to find out the simplest method&to keep the recommendations down to two materials. Use magnesium arsenate spray or copper-arsenic-lime dust; start applications early; apply thoroughly; and immediately after harvest disk and then plow down the vines with a wide bottom plow.

Professor Stafford delivered a paper at Kansas City on the complexity of insecticides, a short paragraph of which will give an idea of what is desirable to avoid:

"FABLE: A man long ago recommended for a certain ailment a certain salt. Of those who suffered and heard him, ninety per cent used the salt and were cured. Then he suggested that they dissolve the salt in water, whereupon seventy-five per cent used the salt. He stated proportions, four and a half ounces of salt in nine and a third quarts of water, and sixty per cent used it. He warned against any but china receptacles and forty-five per cent used it. He recommended that the water first be boiled and thirty per cent used it. When he said that the solution should be strained through muslin, fifteen per cent used it. He finally indicated distilled water for the solution and then nobody used it at all. Each modification had been sound and wise and he was much disappointed. Now he gave his solution a name and made it up himself and everybody used it.

"MORAL: Everything else being equal, the number of persons who will adopt a recommendation varies inversely with the number of points of complexity in the recommendation."

Discussion: Led by Ralph O. Dulany, Fruitland, Maryland

The following paragraph is a statement of the practices as carried out by Mr. Dulany on his acreage in 1929:

Better results were secured with three pounds of magnesium arsenate than with the recommended two pounds, particularly after the beans had reached considerable size. It was felt that it was better to begin spraying as soon as the first beetles appeared, in order to keep them from laying eggs. A very important control measure is the turning under of vines as soon as the crop is off. In most cases satisfactory control was secured with two applications of spray. It was necessary to make more applications of dust than of spray for the same relative control.

General Discussion: There is need for a good small sprayer. Dusters do not put the material on the under side of leaves as well as sprayers.

Disease and red spider injuries were often mistaken by the grower last year for spray injury.

There are no figures to show whether spraying or dusting causes blossom-drop, but the bean blossom is fairly well protected and it does not seem that it would be easily injured.

Dr. Neal Howard, of the U. S. Department of Agriculture, gave the following results: The two most important control measures are the thorough spraying of the under side of the leaves and the turning under of the vines after the crop is harvested.

Spraying should start when the eggs become numerous, unless the adult beetles cause considerable damage before that time. It might be desirable under conditions of heavy infestation to use three pounds of magnesium arsenate to 100 gallons of water, but if timely applications are made, two pounds will give equally as good results

VEGETABLE GROWERS NEWS LETTER.

Issued by
Maryland Vegetable Growers Association.
W. R. Ballard, Secretary-Treasurer.

Vol. VII. No. 4. College Park, Maryland. April, 1930.

A New Circular: Mr. L. M. Goodwin, Canning Crops Specialist, has written a circular, "The Culture of Peas for Canning," which in a brief and convenient form sums up the consensus of opinion regarding the methods best adapted to the culture of this crop in the Tri-State territory. From eight to ten thousand acres are annually devoted to the production of peas for canning in Maryland. The average yield is slightly more than one ton per acre. Some of the topics discussed in the circluar are soils, lime, fertilization, varieties, inoculation, seeding, harvesting, diseases and insects, and yields.

This is Circular No. 79 of the Extension Service, University of Maryland, College Park, Maryland.

Plant Patents: Curtis Nye Smith in the Seed World notes that on March 24th, Senator John G. Townsend of Delaware filed in the United States Senate S. 4015 entitled, "To provide for plant patents." This is an amendment to the present Patent Law designed to give to the person who invents, discovers, or asexually reproduces any distinct and new variety, not known or used by others in this country prior to the invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, for more than two years prior to his application, a patent for the exclusive right to make, use, vend (including, in the case of a plant patent, the exclusive right to asexually reproduce a plant) this plant invention or discovery throughout the United States and the territories thereof.

For many years the question of assuring adequate reward to the originator of a meritorious new variety has been the subject of frequent discussion and attention but this seems to be the first concrete attempt to secure the sanction of the government in retaining the rights of the originator. It would appear essential that such a measure should be very carefully worded in order that the desired results may be attained. Some board of authority for passing upon the authenticity of the new varieties would be necessary.

A Wilt Resistant Pea: For a number of years Professor C. E. Temple of the University of Maryland has been selecting strains of Alaska peas showing high resistance to the wilt. Arrangements have recently been made with a western seed grower to develop stock of one of the best of the selections. It has been suggested that this be called the Maryland Alaska. The pea is a difficult subject to work with because of the slow process of multiplication. It often requires years to develop seed stock in commercial quantities. The wilt is quite destructive in certain seasons in Maryland and a resistant strain should appeal to both canner and grower.

Mulch Papers are Patented: The International Paper Company has recently won a suit in the U. S. District Court at St. Louis against the Graham Paper Company of that city for infringement on their patent rights offering for sale and selling mulch paper adapted for use in accordance with the invention and coverad by the Eckhart patents.

The investigations of Dr. L. H. Flint of the U. S. Department of Agriculture show that any impervious dark paper free from soluble toxic materials may be as efficaceous in stimulating plant growth as that manufactured especially for use as a mulch. Asphalt roofing papers have been used effectively as a substitute for the special papers and are considerably cheaper in price.

Dealers, however, need to be careful not to infringe patent rights by offering such paper to be used as a mulch for stimulating plant growth.

Supply and Demand: One of the apparently uncontrollable factors in agriculture is the fluctuations in the supply of products. Growers seem unduly influenced by experiences of the previous season. If returns from a certain crop have been good, a greatly increased acreage is put out and this often results in a glut on the market and so the following year the acreage is reduced. Of course climatic conditions enter into the equation upsetting all calculations and predictions. This swing from one extreme to the other develops cycles with more or less regularity. The length of the cycle varies with the crop, depending somewhat upon the length of time it takes to get in and out of a certain line. The cycle for asparagus would undoubtedly be longer than for cabbage or potatoes. The field of agriculture is not the only one where these fluctuations exist. The manufacturer, however, has more control over production, partly because he can immediately check production while the farmer must continue through the season once the crop is planted. The manufacturer also has production concentrated more in central plants under one management while independent farm units are in competition with one another. The problem of developing and maintaining a stable supply of products grown on the farm is one that will tax even the Farm Board to solve. Perhaps after all, economic necessity is the only force to bring about cooperative effort in this direction.

VEGETABLE GROWERS NEWS LETTER.

Issued by
The Maryland Vegetable Growers Association.
W. R. Ballard, Secretary-Treasurer.

Vol. VII. No. 5. College Park, Maryland. May 1930.

Something to Read

The Maryland Experiment Station is distributing several bulletins of interest to vegetable growers. Bulletin 312. "Variety Studies of Spinach" by F. W. Geise and H. B. Farley, presents among other things, a classification of the varieties commonly sold by seedsmen, and discusses their adaptability to Maryland conditions for marketing and for canning. This crop is grown in three different ways. (1) as a fall crop, (2) fall seeded for spring cutting, and (3) spring seeded for late spring cutting. The varieties adapted to these different methods are indicated.

In Bulletin 313, "Studies of Premature Flower Formation in Wintered-Over Cabbage," Dr. V. R. Boswell, the author, gives the results of investigations of the reasons why over-wintered cabbage sends up seed stalks in early spring instead of making a marketable head. The conclusion is reached that sowing seed as late as possible and keeping the size of plants down to a stem diameter of 3/16 to 1/4 of an inch are the most important factors which have to do with the production of "seeders". Dr. Boswell recommends the practice of making two sowings five or six days apart in case an open fall season induces too much growth in the first seeding.

Mr. Thomas H. White and V. R. Boswell give the results of "Field and Sand Culture Experiments on Fertilizing Asparagus" in bulletin 314. The conclusion is reached that an annual application of 1250 pounds of a 7-3-5 fertilizer in the field gave consistently better results than 10 tons of manure per acre. Applications in early spring gave no outstanding increases over summer applications.

In the sand cultures nitrate of soda and tankage were better sources of nitrogen than was ammonium sulphate. Manure plus kainit or other inorganic fertilizers resulted in the largest increases. The beneficial results of the manure in these cultures was undoubtedly due to the fact that the sand used was quite devoid of organic matter. This perhaps indicates that manure is of considerable importance on light sandy soils, while better results follow the use of commercial fertilizers on the heavier soil types.

The results of a 5 year's test of Irish Cobbler seed potatoes from different sources are given in bulletin 317. The authors R. A. Jehle and E. I. Oswald conclude that certified north-

ern grown seed gave best results, with mountain grown certified seed second and fall grown certified seed third. The smallest average yields were secured from uncertified seed. Considerable variation was noted in stock from different individuals from Northern sections and it is apparent that health and vigor of the seed stock is the most important factor which influences productivity.

The results of tests of tomato varieties suited to use for canning are given by F. W. Geise in bulletin 318. The same author in bulletin 320 discusses the relation of the physical and chemical properties to quality of spinach for canning. (a) The maximum yield of trimmed spinach per unit of field run is greatest during the early part of the fall crop. From the standpoint of production and yield of trimmed spinach the over-wintered crop is the lowest yielder under conditions similar to those in Maryland.

(b) The quality of canned spinach is directly related to the raw stock. High quality of raw stock goes to make a high quality canned product.

To get the highest quality possible from a given lot of raw stock the product must be handled with the greatest possible speed from the time it is harvested until canned.

The Annual Report.

The annual report is now being printed and it should not be long before the reports are ready for distribution. The report will be sent to all paid-up members. If your dues are not paid for 1930 insure receiving your copy of the report by mailing at once to the Secretary your check for $1.00 for dues.

The Spring Drouth.

A record period of dry weather for the spring season has recently been brought to a close by rains which have been quite general. Crops have greatly benefitted from these showers although early crops such as peas have been injured too severely to make much of a crop. The strawberry crop has been hard bit. Losses in Maryland due to the dry weather have been estimated in the millions.

VEGETABLE GROWERS NEWS LETTER.

Issued by
The Maryland Vegetable Growers Association.
W. R. Ballard, Secretary-Treasurer.

Vol. VII No. 6 College Park Maryland. June 1930.

Dry Weather

The annual rainfall for Maryland is slightly over 41 inches. Usually it is well distributed so that most crops develop in a satisfactory manner. Mr. Thos. H. White, of the Experiment Station, considers that an average of one inch of rainfall a week is needed to keep crops in good growing condition. Obviously a greater supply is needed during the summer months than during the winter because of the larger loss through evaporation.

The weather Station at College Park reports the following rainfall records.

April 3.53 inches.
May 1.63 inches.
June(15 days) 1.11 inches

It can readily be seen that the record falls considerably short of the suggested inch per week.

It often happens in periods of dry weather that temperatures run above normal. It is largely for this reason that artificial watering does not seem to produce the same effect as the same amount of water falling as rain. Under such conditions cool climate crops such as lettuce fail to head properly even though moisture be supplied artificially. One wonders if mulch papers might not be of value in this connection. It is probable that a light colored paper reflecting the heat rays would be preferable to the dark colored papers usually recommended, as this would tend to keep the soil cooler.

Studies in the long and short day indicate that some means of shading from the intense heat rays would be beneficial with some crops.

Chain Stores Buy Locally

Local truckers have been somewhat disturbed because of the fact that the chain grocery stores have been taking business away from the independent grocer and in so doing buy their supplies wholesale from sources sometimes far removed from the location of the particular store.

Recent incidents indicate that the chain store buyers are not inherently prejudiced against local truckers. In many cases the buyers would prefer to deal with the nearby producer provided he can furnish the quality desired and in sufficient quantity to supply their needs. Perhaps instead of criticising the chain stores it would pay vegetable growers to find out just what their buyers need and then proceed to supply them with suitable products.

Bean Beetle Control

The Department of Entomology of the University of Maryland has been testing out many of the large number of insecticides for the control of the Mexican bean beetle. The effectiveness of the mixtures sold vary so greatly that P. D. Sanders, Associate Entomologist felt impelled to make a statement regarding results of tests recently made.

In general the liquid sprays have given better control than have the dusts. Magnesium arsenate used at the rate of 2 or 3 pounds to 100 gallons of water or 4 tablespoonsful to 3 gallons should be given preference over all other materials. It will combine safely with bordeaux. Pyrethrum sprays will kill large numbers of larvae and adults struck by them, but the high cost of the material and the necessity for frequent applications to get control tends to limit its use to the small garden.

For dusting, a copper, arsenic lime dust containing 20 percent Mono-hydrated copper sulfate, 20 percent calcium arsenate, and 60 percent hydrated lime, appears to be the most satisfactory when used at the rate of 15 to 20 pounds peracre. A 15-15-70 copper arsenic lime dust showed considerable promise last year. The dusts are used on many other vegetable crops and this makes them a very practical proposition. Magnesium arsenate, 1 pound to 3 pounds of lime, is a safe and effective dust.

Cantaloupes and Cucumbers.

Liquid sprays have given better results on these crops than the dusts because of their better sticking properties. Bordeaux arsenate, 2 lbs. copper sulfate, 4 lbs. stone lime or 6 lbs hydrated lime, 50 gallons of water, and 1½ lbs. of arsenate of lead, is recommended.

Dusts containing 15 to 20 percent Mono-hydrated copper sulfate and an equal percentage of calcium arsenate with hydrated lime as the carrier have given good commercial control. Use 20 lbs per acre.

Spraying operations should begin when vines begin to run and repeat applications at weekly or ten-day intervals depending upon weather conditions. Usually five applications are sufficient

Club Root of Crucifers.

Technical bulletin # 181 of the U.S.D.A. discusses this disease and finds that hydrated lime is effective in its control.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF MARYLAND

UNIVERSITY OF MARYLAND
U. S. DEPARTMENT OF AGRICULTURE
COOPERATING

EXTENSION SERVICE

VEGETABLE GROWERS NEWS LETTER

Issued by - - - W. R. Ballard,
Secretary-Treasurer, Maryland Vegetable Growers Association.

Vol. VII. No. 7. College Park, Maryland. July, 1930.

New Canteluupe Bulletin: The Agricultural Experiment Station, East Lansing, Michigan, has just issued Special Bulletin No. 193, under the title, "Canteloupe Production in Michigan." Osage, Bender, Hoodoo and Morrill's strain of Hearts of Gold are the principal varieties raised for commercial production.

One significant statement is as follows: "Declining prices are generally associated with declining quality. When quality remains high, prices tend to remain high. Quality is more generally potent in affecting prices than supply."

The proximity of bee hives seems to have an important influence on the setting of fruit.

Spraying with Bordeaux mixture gives better disease control than the monohydrated copper-lime dust, although the proper timeingof applications is an important factor.

The authors, Messrs. Edmond, Strand, and McNall discuss quite generally the cultural practices of the commercial growers in Michigan. Members who are growing this crop would find the bulletin interesting to read and many of the recommendations would be found applicable to Maryland conditions.

More Vegetables and Fruit Needed: Newspaper reports indicate that the lack of vitamins D may be largely responsible for the prevalent decay of teeth. This vitamine is found in fresh vegetables and fruits and is easily destroyed in cooking. It has been known for many years that fresh fruits and vegetables were needed in the diet to prevent scurvy among sea-going people, but it appears that larger quantities are needed to prevent tooth decay than would be required to prevent scurvy. If experimental work upholds this new idea, it should further stimulate the use of products from the truck farms.

Turnips a Good Fall Crop: For fall and winter use seed may be sown in July and August. Ruta Bagas require more time for development and seed should be planted in June or early July. This crop is raised either in rows to be cultivated or broadsast. About two pounds of seed would be needed per acre. For best results plants should not stand too closely.

Just before winter sets in roots are taken up, topped, and stored in a cool cellar or pit out doors. For high quality, turnips should make a rather quick growth. Fertile soils well supplied with humus usually give good crops.

The Purple Top Globes are popular varieties for general use.

Mulch Paper: The prolonged dry season should provide a thorough test of the efficacy of mulch papers in the production of vegetable crops. It would be interesting to compile the reports of growers who have used the paper mulch under the trying conditions existing this year. The secretary will appreciate a statement of your experience at the end of the season. Let us have your report so others may profit thereby.

The V.G.A. The 22nd Annual Convention of the Vegetable Growers' Association of America will be held in Milwaukee, August 11th to 15th, 1930. Headquarters will be at Hotel Schroeder. Any of our members who find themselves in this part of the country on these dates will be well repaid for getting in touch with the convention. A line to Mr. John Budzein, Station D. R-2, Milwaukee, Wisconsin, or Mr. Frank Held, 2600 Lockbourne Avenue, Station G, Columbus, Ohio, will bring you information concerning this convention.

No Loss Without Some Gain: Many plant diseases are dependent upon the presence of moisture for the germination of spores. Consequently in a dry season the damage resulting from such attacks is almost nil. Septoria on tomatoes is a good illustration of this situation. However some diseases seem to thrive despite the prevalence of conditions inimical to the well being of the crop. Crown rots and damping off funguses often show up worse where there are fluctuations between wet and dry, than under a more normal state. The mycelium of mushrooms seems to develop in seasons of dry weather and after the rains come the fruiting bodies we call mushrooms appear abundantly in the pastures and meadows.

VEGETABLE GROWERS NEWS LETTER.

Issued by
The Maryland Vegetable Growers Association.
W. R. Ballard, Secretary-Treasurer.

Vol. VII No. 8 College Park Maryland. August 1930.

Farmers Marketing Conference

A four day marketing conference has just closed at the University of Maryland. The attendance was larger than its sponsors anticipated because of the unusual drouth conditions. Because of the emergency created by the extended dry period a special committee drafted a set of resolutions recommending emergency measures which was adopted by the conference.

Word was received from Washington that freight rates would be cut on importation of feed for livestock and made applicable to all counties in Maryland. The County agents are made the responsible officers in their respective counties for issuing certificates for this purpose.

One of the questions constantly stressed during the conference was the necessity of producing quality products and of grading and packing in such a manner as to meet competition from other areas.

The Maryland State Department of Markets has issued a pamphlet giving the recommended standards for grading, packing and inspection of fruits, vegetables and eggs. Producers should procure copies of this publication in order to be posted on market standards.

Growers who have availed themselves of shipping point inspection generally regard this as a safeguard and results have been quite satisfactory.

Dr. James Boyle, of Cornell University presented a very interesting talk on "The chain Store and The Cooperative Movement."

Because of the many valuable papers presented and the valuable discussions which followed, it is planned to issue an abstract in the near future and it may be possible to send a copy to each member of the Vegetable Growers Association.

Blossom End Rot of Tomato

This trouble is prevalent in tomato fields this season because it is a physiological disease caused by lack of moisture. It corresponds more or less to tip burn of leaves. Apparently the only preventive of this trouble is to insure an adequate moisture supply,

through maintaining the water holding capacity of the soil or through mulches or artificial irrigation.

Irrigation would, perhaps, have been a profitable operation this season if growers had been properly equipped. However, it is questionable whether over a period of years artificial irrigation will pay in Maryland except, perhaps, in the intensive production of such crops as lettuce which can be planted closely. There are periods in practically every season when artificial watering could be used to advantage, while at other times the problem is to remove excessive quantities of moisture. The problem is to make the water supply available at the time needed without investing too much capital in equipment to be used for only short periods during the year. The experiences of the present season will no doubt stimulate a more careful consideration of the possibilities of artificial watering of vegetables.

Growth of Potato Certification

Dr. R. A. Jehle contributes the following figures to show the growth of interest in the production of high grade seed stocks in Garrett County, Maryland. As will be noted much of this work is in the hands of the Boys Clubs and they have made an enviable record in this comparatively new field.

	Total Number of applicants	Applicants Eligible for Certification	Total Number of acres inspected	Acres eligible for certification
Adults 1929:	8	2	28.25	11.75
1930:	15	12	58.75	17.50
4H Boys Club members				
1929:	24	20	7.50	6.00
1930	54	45	32.75	27.50

In both years the adults had a larger proportion of their acreage disqualified than did the boys. This was due to the fact that the seed furnished to the boys was seed which originated from a single disease-free tuber and all diseased hills were removed each year. The boys used mostly the Russet Rural variety while the adults used in addition some White Rurals and Irish Cobblers.

The Annual Reports

The papers presented at the last annual meetings of the Association were recently mailed to all paid-up members. If you failed to receive your copy, let the Secretary know at once.

A movement is on foot to get the reports printed and distributed earlier in the season than heretofore. The plan suggested is to issue the individual reports as ready, later binding them together in the complete report. This involves some difficulties in paging and indexing but there are many who believe that this is a lesser evil than holding up the individual reports until so late in the year as is now done..

VEGETABLE GROWERS NEWS LETTER.

Issued by:
The Maryland Vegetable Growers Association.
W. R. Ballard, Secretary-Treasurer.

Vol. VII No. 9 College Park Maryland. ~~August~~ September 1930.

Where does your Fertilizer Come from?

Last year the Farm Journal published some data on the sources of plant feeding materials in a form which makes the information readily available. Because of its value the table of materials is herewith reproduced. The figures in the table represent the pounds of chemical plant food in 100 pounds of the fertilizer material.

A--Organic Plant-Foods.

	Pounds in 100 pounds			
	Nitrogen	Phosphoric Acid	Potash	Total Plant-Food
Containing Nitrogen Only, or Chiefly Nitrogen				
Dried Blood.....	9-14	0	0	9-14
Garbage Tankage.....	2-10	0	0	2-10
Hoofs and Horns.....	11-15-.5	0	0	11-15.5
Hair.....	8-11	0	0	8-11
Feathers.....	15	0	0	15
Castor Meal.....	4.9-6.6	0	0	4.9-6.6
Cocoa Cake.....	3.5-4.5	0	0	3.5-4.5
Peat or Muck.....	0.8-4	0	0	0.8-4
Containing Chiefly Nitrogen and Phosphoric Acid.				
Tankage.....	5-10	3.5-10	0	8.5-20
Meat Meal.....	10-11.5	1-5	0	11-16.5
Bonemeal (raw).....	3.4	20-25	0	23-29
Bonemeal(steamed)...	1.6-2.5	23-25	0	24.6-27.5
Fish Scrap(Dried)...	6.6-10	4-8	0	10.6-18
Fish Scrap(acidulated)	4-6.6	3-6	0	7-12.6
Sludge.....	5-10	2-3	0	7-13
Containing Chiefly Nitrogen and Potash.				
Tobacco Stems.....	1.5-3.5	0	4-9	5.5-12.5
Containing All Three Elements				
Horse Manure(fresh)11	0.5-0.7	0.3-0.5	0.5-0.6	1.3-1.8
Cow Manure(fresh)....	0.4-0.5	0.2-0.3	0.4-0.5	1-1.3
Sheep Manure(fresh)..	0.8-1	0.4-0.5	0.6-1	1.8-2.5
Sheep Manure(dried)..	2.5	0.7	1.5	4.7
Pig Manure(fresh)....	0.4-0.8	0.2-0.4	0.3-0.4	0.9-1.6
Hen Manure(fresh)....	0.8-1.4	0.2-0.9	0.2-0.9	1.2-3.2
Hen Manure(dried)....	1-2	0.4-2.2	0.5-1.1	1.9-5.3
Cottonseed Meal.....	6-7.5	2-3	1.5-2	9.5-12.5
Linseed Meal.....	5-6	1.3-1.8	1.3-1.4	7.6-9.2
Wheat Straw.....	0.4-0.5	0.1-0.2	0.7-0.8	1.2-1.5

Rye Straw.....	0.5-0.6	0.2-0.3	0.8-0.9	1.5-1.8
Oat Straw.....	0.6-0.7	0.2	1.1-1.5	1.9-2.4
Marsh Hay.....	0.9	0.5	2.7	4.1
Rice Straw.....	0.6-0.8	0.1-0.3	0.4-1.5	1.1-2.6
Wood Shavings.....	0.1	0.1	0.3	0.5
Corn Stover.....	0.7-1	0.3	1-1.2	2-2.5
Leaves.....	0.8	0.2-0.3	0.3-0.4	1.3-1.5

B.--Chemical Plant-Foods.

Containing Nitrogen Only

Nitrate of Soda.....	15-16	0	0	15-16
Sulphate of Ammonia...	20.5	0	0	20.5
Cyanamid.....	20.5-24.7	0	0	20.5-24.7
Urea.....	46	0	0	46
Calcium Nitrate..... (28% lime)	15.5	0	0	15.5
Ammonium Nitrate.....	35	0	0	35

Containing Phosphoric Acid Only

Superphosphate.....	0	14-15	0	14-45
Basic Slag.....	0	10-25	0	10-25
Ground Phosphate Rock,	0	18-40	0	18-40

Containing Potash Only

Muriate of Potash.....	0	0	50	50
Sulphate of Potash....	0	0	48-50	48-50
Carbonate of Potash...	0	0	15-50	15-50
Manure Salts.....	0	0	20-30	20-30
Kainit.....	0	0	12-14	12-14
Kelp Ash.....	0	0	15-30	15-30

Containing Nitrogen and Phosphoric Acid

Bone Black.....	0.8-1.6	32-35	0	32.8-36.6
Ammonium Phosphate....	13-20	48-20	0	61-40

Containing Nitrogen and Potash.

Nitrate of Potash.....	12-14	0	44-46	56-60

Containing Phosphoric Acid and Potash

Wood Ashes(fresh).....	0	1.5-2	3-7	4.5-9
Greensand Marl.....	0	2.2	2-8	4.2-10.2

VEGETABLE GROWERS NEWS LETTER
Issued by
The Maryland Vegetable Growers Association.
W. R. Ballard, Secretary-Treasurer

Vol. VII No. 10. College Park, Maryland October 1930.

"Intake of Nitrates Needed for Vigorous Cauliflower Growth."

"Lack of Nitrates in Soil May Result in Small Unmarketable Heads.

"Large, solid heads of cauliflower are the kind desired by growers because they bring the greatest returns, according to W. Rei Robbins, assistant professor of vegetable gardening, New Jersey College of Agriculture. "A small, unmarketable head, produced prematurely, represents a partial or complete loss of seed, fertilizer and labor," he says. "Fortunately, by intelligent management a grower may do a great deal to avoid the production of these small 'buttons' if he understands certain principles of plant growth.

"It is important to remember that conditions which favor carbohydrate accumulation and protein deficiency in plants are correlated with a decreased rate and small amount of leaf and stem growth and with early formation of flowers or seed, or the other premature heads or 'buttons' in cauliflower. These principles have been demonstrated repeatedly with many different plants. Recently, controlled sand culture experiments with cauliflower showed that the plants grown with a low nitrate supply were low in protein but high in carbohydrates. Such plants invariably produced premature heads or 'buttons,' whereas other plants also grown under the same conditions but with abundant nitrates produced large solid heads.

Cause of "Buttoning"

"It is therefore apparent that lack of nitrates in the soil may cause 'buttoning.' Likewise, if nitrates are unavailable to the plant because of a dry soil, protein will be comparatively low, carbohydrates will accumulate, and an undesirable 'button' will be the result. In fact, disease, insect or mechanical injury to the roots or base of stem or any other factor which may seriously retard the intake of a liberal supply of nitrates by the plant will result in carbohydrate accumulation and the formation of a premature unmarketable head.

"For the maintenance of vigorous growth and the production of a large, marketable head, intake or absorption of nitrates by the plant is essential. This process alone, however, is not enough. The plant must change nitrates to protein before new tissue can be formed. A low temperature definitely limits or may entirely stop the transformation of nitrates to protein by the plant and may accordingly result in a prematurely heading plant, deficient in protein and high in carbohydrates.

"During the early growth of cauliflower plants it is therefore essential to avoid extremely low temperatures or any other condition which may seriously retard either the absorption of nitrates by the plant or the change of nitrates to protein in the plant."

(From the Fertilizer Review)

Exhibits at Fairs

Observations made at the fairs this fall would certainly lead one to conclude that there was no lack of vegetable products in the state. In quantity many of the exhibits have been fully up to normal. In many cases the quality has been excellent. No good cabbage has been seen on exhibit and several other items have been low in quality. Early potatoes were plentiful but few good late potatoes have been seen. Several fine selections of sweet potatoes were noted.

The dry weather has undoubtedly hurt many vegetables particularly those planted for late crops, yet some effects of the drouth have been beneficial. One of the most outstanding benefits has been the unusually high quality of the cantaloupes. The sugar content has been notably higher than in normal seasons.

The Annual Meetings

It is time to begin thinking about the annual meetings to be held in Baltimore early next January. What problems would you like to have discussed? Is there some man you would especially like to hear? Or is there some general topic around which all the discussions should revolve. The Secretary will appreciate any suggestions coming from the members relative to making up the program. We get together only once a year and the meetings should be made as profitable as possible in the limited time available.

VEGETABLE GROWERS NEWS LETTER
Issued by
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W. R. Ballard, Secretary-Treasurer.

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Potato Exhibit.

The Association is planning to sponsor an exhibit of potatoes in connection with its annual meetings at the Lord Baltimore Hotel in Baltimore on January 7th and 8th, 1931. Entries will be limited to growers of certified seed potatoes, and only those potatoes which have been certified by the Maryland Seed Certification Board will be accepted. Thirty-two potatoes will constitute an exhibit. No entry fee will be charged.

The following prizes are offered:

Irish Cobbler - 1st. $5.00; 2nd, $4.00; 3rd, $3.00; 4th, $2.00; 5th, $2.00 and 6th, $1.00.

Rural Russetts - 1st, $5.00; 2nd, $4.00; 3rd, $3.00; 4th, $2.00 5th, $2.00 and 6th, $1.00.

Any other variety - 1st, $4.00; 2nd, $3.00; 3rd, $2.00; 4th, $2.00 and 5th, $1.00.

Sweet Potatoes, Any Variety. 1st, $4.00; 2nd, $3.00; 3rd, $2.00 4th, $2.00 and 5th, $1.00.

Prize winners will be expected to join the Maryland Vegetable Growers Association, which entitles them to the annual report and to the monthly news letter. This Show should give excellent publicity to the production of certified seed in Maryland as well as to stimulate the demand for such seed.

The Rainfall.

The following table indicates the general situation in Maryland for the nine months up to October first. Reports from ten representative sections are included. A wide variation will be noted in the rainfall but all sections are below the normal for the State which is a little over 40 inches for the year, or an average of about 3 1/3 inches per month. Thunder showers during the summer seems to have been extremely localized, resulting in a spotted condition of crops.

MARYLAND -- Rainfall for 1930.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Total.
Oakland	1.43	3.00	2.46	2.81	2.85	4.61	1.91	2.37	1.67	23.11
Keedysville	1.89	1.53	3.35	2.61	0.73	4.94	0.18	0.90	1.59	17.72
College Park	3.24	1.80	2.03	3.33	1.95	2.27	0.71	0.71	0.91	16.95
Mechanichsville	4.31	2.68	1.00	2.79	4.66	3.07	0.90	0.34	0.65	20.40
Darlington	2.93	2.40	2.61	2.61	1.59	3.01	3.12	0.31	2.35	20.93
Elkton	3.48	2.80	2.33	1.58	2.77	2.67	2.94	2.07	1.26	21.90
Ridgely	3.59	1.86	1.09	1.77	1.59	2.17	1.82	0.63	1.01	15.53
Cambridge	3.81	1.51	1.13	1.62	2.79	2.26	2.85	1.83	0.70	18.50
Salisbury	3.75	1.48	1.64	1.63	2.62	2.49	1.00	0.90	0.99	16.50
Pocomoke City	2.94	1.97	2.04	1.43	3.10	2.83	2.75	0.61	1.26	18.93

Prospects.

According to data from the U. S. Bureau of Economics "The rain of November 4, which was the first general rain in about six months, came too late to be of benefit to the fall crop of spinach. Present estimates indicate that around 100 acres from a planted acreage of 1500 will be available for harvest, most of which is in the Bradshaw section. With an indicated yield of 250 bushels the production is forecast at 25,000 bushels as compared with 229,000 bushels produced for shipment on 800 acres in the fall of 1929. The seed for the spring crop is planted in January. An acreage similar to a year ago seems probable for the 1931 spring crop."

In the Norfolk section production of the fall crop of spinach is 82% below that of 1929. Sprouting broccoli in this section is about two weeks late and only about 100 acres out of 500 planted will be harvested.

VEGETABLE GROWERS NEWS LETTER
Issued by
The Maryland Vegetable Growers Association
W. R. Ballard, Secretary-Treasurer.

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Program For The Annual Meetings.

The annual meetings will again be held at the Lord Baltimore Hotel in Baltimore, on January 7th, and 8th, The following program has been arranged for the two sessions.

Wednesday, January 7th, 1931

Mezzanine Parlors I and J.

10:00 Call to Order.

10:05 Production of Spinach for Market and Canning.
F. W. Geise,
Rochester, New York.

10:45 Standardizing Vegetable Varieties.
V. R. Boswell
U. S. Dept. of Agri.

11:25 As Cantaloupes are Grown in Michigan.
J. B. Edmond,
(Formerly with Michigan Agricultural College)

12:05 Announcements

Thursday, January 8th, 1931.

Mezzanine Parlors I and J.

10:00 Call to Order.

10:05 Production of Certified Sweet Potato Seed Stock.
R. A. Jehle,
College Park, Maryland.

10:45 Regulatory work of the U. S. D. A. as related to Fruits and Vegetables.
H. A. Spillman,
U. S. Dept. of Agri.

11:25 Competition in the Vegetable Industry.
Ralph Russell,
College Park, Maryland.

12:05 Reports of Committees.

Break O' Day Tomato

Dr. Pritchard of the U. S. Department of Agriculture has scored again in the production of the Break O' Day, a tomato which seems destined to fill a very important place in the early marketing field.

The new variety is a hybrid between Marglobe and Marvana -- the latter being a cross between Marvel and Earliana. Break O' Day ripens earlier than Bonny Best and is almost equal to Earliana in earliness of maturity. The plants are productive of fruit which closely resemble Marglobe in depth of fruit and thickness of wall. The fruit should pack and ship in excellent shape.

Irrigation

The question of artificially watering vegetable crops has come to the front again because of the extremely dry season. Whether the method is practical or not will depend in a large measure upon whether or not a dependable supply of water is available and whether it can be applied to the land at a reasonable cost.

It is rare in ordinary seasons when there are not periods in which vegetable crops would not benefit from applications of water, and in abnormal seasons such as the one just experienced success or failure with many crops hinged upon artificial watering.

Laying Mulch Paper

Various machines both horse drawn and hand drawn are being perfected for laying quickly and efficiently mulch paper, for the growing of vegetable crops. If the paper is to have a wide application to commercial production it will be very essential to have satisfactory methods for laying the paper. The principle upon which the machines now in use work is to unroll the paper on the land at the same time throwing a furrow of soil over each edge to hold the paper in place.